

## Research Article

### Fast-food Consumption among College Students Based on Cost and Thermal Analysis

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**Abstract:** The starting point of this study was to assess college students to spend money and calories in fast food consumption within the university campus. Undergraduate Students (18 years old-24) to facilitate sample (N = 152), participated in the university in the use of researchers developed a way of life and collecting food frequency questionnaire, dietary intake measurements from seven Behavior Survey health practices survey data on the local fast-food chain. A strong positive correlation between the total monthly expenses and total monthly snack calorie consumption ( $r$  (under 150) = 0.94,  $p < 0.05$ ) was found between, showed a significant linear relationship between two variables. Compare the cost of men's average monthly snack for women's t-test for independent samples found significant differences between the two groups ( $t$  (150) = 4.19,  $p < 0.05$ ). More money spent by college students a higher contribution amount of calories from fast food consumed in a typical month. Future studies are needed to determine the college students contribute to the high rates of obesity, if the restrictions on college campuses around the snack bar, will help to reduce the consumption of fast food in college students.

**Keywords:** Calory, dietary intake, fast food, Fast Food Frequency Questionnaire (FFFQ), health

## INTRODUCTION

The proportion of fast-food consumption, leading to the incidence of obesity and related health problems increased significantly over the past few decades (Jeffery *et al.*, 2006). 2006, the RMB had a dollar every five dollars spent on retail shopping malls to purchase food and beverages (Tillotson, 2008). Consume more energy than when leading to weight gain and obesity. In the 15 years that eating fast food more than twice the individuals of about 10 Pounds/week, have insulin resistance, which leads to twice the increase of type 2 diabetes, the consumption of fast food less than twice a week (Pereira *et al.*, 2005). Americans who consume from fast food 3 to 6 times/week had a significantly higher Body Mass Index (BMI) less than those who from fast food (Price and Taste Trump Nutrition When Americans Eat Out, 2009) No consumption or twice a week. All in all, the report shows any adult fast-food consumption are more likely to be overweight (Bowen and Vinyard, 2004).

Eat fast food more often than not eat fast food consumption (Harnack and French, 2003) more total calories, less nutritional value (i.e., vitamins minerals, fiber). In addition to calories, eating fast food more than adults do not eat fast food and to consume higher amounts of fat and refined sugar. While most of the fast food restaurants now offer some healthy choices, which may not affect food choices and providing healthy snack choices, but still higher sodium, calories, saturated fat than the recommended 2,000 calories our main diet (David Jayakar, 2008).

Youth ages 19-20 years of personal consumption from snack products and more calories less than 12-18 years old adolescents (Nielsen *et al.*, 2002). Adults age of fast food age 20~29 significantly greater consumption, about four times and with respect to the 55 years and older. Ages 19-25 year old college student who reported that the most important reason is the convenience of fast food consumption and costs (the primary reason being to facilitate) (Driskell *et al.*, 2005). A similar conclusion, students in the 19-24 year-old men who eat fast food because of convenience and cost are likely to choose fast food (Morse and Driskell, 2009). Men tend to consume more fast food (Feeley *et al.*, 2009) per week than women.

In 2007, Beijing, Shanghai and Shenzhen, the incidence of obesity is highest in three cities and Jiangsu, Guangdong outdone. From 2004 to 2006, adults with diabetes in Jiangsu, Guangdong is one of the highest proportion (9.3% in Jiangsu, Guangdong and 9.4%) (Bowen *et al.*, 2004) in China. In 2006, Jiangsu and Guangdong ranked obesity people are fast-food users.

Although studies have been carried out fast-food consumption among college students, but no studies related to the amount of heat it takes to consumption by college students. The purpose of this study was to evaluate the heat consumption of fast food snack from the specific identification of items. The researchers hope that through research, visits, these popular fast-food chain and what impact on the students, as well as how these choices diet is good for their health and budget.

## MATERIALS AND METHODS

After peer review, the researchers developed a Fast Food Frequency Questionnaire (FFFQ), is in a moderately sized university, the University of living survey used to collect health and food consumption data of traditional college students. Five registered dietitian review FFFQ, in order to ensure that no stray food. Living with a previously validated survey retest University Students. The traditional college students, ages 18-24 years old, currently studying at the university were recruited to complete using flyers and giveaways (stress balls and pencil) on the campus of the survey, students who complete the survey can get 100 Yuan a university bookstore gift certificate.

**Fast food frequency questionnaire:** The FFFQ distributed in seven fast-food restaurants, which are located on or near campus marketing Campus 123 kinds of food and beverages. These restaurants and catering projects based on previous investigations, most college students are selected to go to the snack bar. Select snack foods include McDonald (13 foods, four beverages), Burger King (15 foods, beverages 4), Subway (15 in food, 2 drink), Wendy (12 of food, 2 drink), Taco Bell (28-food items 2 drinks), chic-FIL-A (12 food, beverage 3) and Bojangles (9 food and beverage 2). Food categories were assessed, including soft drinks and other sugary drinks, chicken, hamburgers, French fries and desserts. Taco Bell food including tacos, tortillas, corn chips, fried rice and fried tacos and subway, including 6 inches and 12 inches of sandwiches. Medium weight is based on each restaurant at that time released weight. A small serving size is half the size of a medium weight and a large amount is considered at least times.

Individual food and beverage consumption frequency was consumed by a month to determine which subtotals by each participant and the number of all food and beverage determined by each participant. Each food and beverage products, the participants of the selected measurement frequency of consumption: none (0), one (1) month, less than one (3) week 1-2 times a week (6), 3-each weeks (14) 4 times, 5-Weekly (22) 6 times a day (30), or once a day (60) is less than the above. Small (0.5), the medium (1), or large (1.5): by multiplying the frequency by a selected amount calculated for each food and beverage products generally intake.

These particular foods and beverages, priced from various fast food chains and local records, spent CNY will be calculated, that is, a researcher visited various restaurants and record every one interested in food costs. Among them, small, medium and large (very large) Food prices are on the rise.

**College life survey:** Students living survey includes 37 questions, including demographic status, medical condition, anthropometric and lifestyle information. This study is part of a larger study, including the survey

population status, anthropometry and living environment. Population issues include: gender, age, marital status and income. Body Mass Index (BMI), calculated from the weight and height measures. Also asked about the students' living environment, including whether they live on campus, if they have a campus meal plan, who is responsible for preparing meals (self, other notable, canteens, fast food, parents). Statistical data using Statistical Procedures Social Sciences (SPSS) carried out, version 17.0. The university's internal review board approved all procedures.

## RESULTS AND DISCUSSION

**Results:** A total of 152 college students participated in the study. Participants were 40% (N = 61) of men and 60% (N = 91) of the female students. All of the surveyed students reported past month at the point of consumption of fast food. Seventy-one% (N = 108) reported their meal plan. Meal plans have their own species, male and female students frequency of 68 and 74%, respectively. Participated in 62% of the respondents lived on campus. The report shows that they have a meal plan of 83% of students live on campus and 31% live off campus.

The correlation coefficient, calculated as the relationship between the total monthly expenses and total monthly snack calorie consumption. A strong positive correlation ( $r$  (under 150) = 0.94,  $p < 0.05$ ), which indicates that between two variables significant linear relationship.

Comparison of average monthly consumption of fast food shops, independent samples t-test showed that male and female students, there are significant differences between the two groups ( $t$  (150) = 4.19,  $p < 0.05$ ). Male students the average monthly cost of fast food restaurants is significantly higher than 99.17 Yuan, the average monthly female students at a cost of 52.11 Yuan snack. Comparison of monthly average calorie intake independent samples t-test showed that male and female students, there are significant differences between the two groups ( $t$  (150) = 4.82,  $p < 0.05$ ). The monthly average calorie intake of boys is significantly higher than 17657.66, the monthly average calorie intake of female students 8053.80.

Independent samples t test was used for the calculation and comparison, the average monthly consumption of fast food restaurants in the students and the students themselves and no meal plans, no significant difference ( $t$  (150) = 1.47,  $p > 0.05$ ). In Table 1 to provide students with an average of 65.57 Yuan university meal plan.

Independent samples t test was used for the calculation and comparison, calories from fast food consumption of students have their own meal plan with a monthly average student. There was no significant difference ( $t$  (150) = 1.93,  $p > 0.05$ ). To provide students with an average meal plan 10629.92±10439.69 not significantly higher than the non-meal plan 15044.76±17305.05.

Table 1: Mean dollar spent per month by specific fast food chain restaurant for those with a meal plan compared to those without a meal plan

Fast food restaurant	Mean \$/have a meal plan	Mean \$/no meal plan
McDonald's	\$9.19±18.01	\$15.34±27.57
Burger King	\$2.96±11.42	\$6.62±12.49
Subway	\$35.22±88.34	\$17.80±53.50
Wendy's	\$4.46±7.00	\$11.10±20.00
Taco Bell	\$3.65±8.55	\$5.16±9.03
Chic Fil A	\$13.29±18.65	\$13.03±25.62
Bojangles	\$5.50±11.04	\$15.04±35.21
Monthly mean totals	\$73.37±100.08	\$84.33±96.18

Table 2: Dollar value spent and frequency per month by fast food chain restaurants for select food items with comparable calories

Fast food chain	Frequency	Dollar value/item	Kcals/item
McDonalds (n = )			
Hamburger	14	\$0.90	270
French fries	71	\$1.30	450
Soda	46	\$1.30	310
Chicken McNuggets	14	\$2.20	190
Burger king (n = )			
Hamburger	3	\$0.90	130
French fries	31	\$1.30	400
Soda	28	\$1.40	280
Chicken tenders	9	\$1.00	180
Subway (n = )			
Soda	41	\$1.39	220
Sweet tea	15	\$1.39	140
Wendy's (n = )			
Hamburger	10	\$0.99	360
French fries	46	\$1.49	470
Soda	39	\$1.29	180
Chicken Nuggets	26	\$0.99	210
Taco bell (n = )			
Soda	25	\$1.29	200
Sweet tea	9	\$1.29	140
Chic-Fil-A (n = )			
French fries	55	\$1.45	290
Soda	34	\$1.29	220
Sweet tea	12	\$1.29	300
Chick-N-strips	10	\$2.59	230
Bo jangles (n = )			
French fries	44	\$1.29	344
Soda	18	\$1.49	220
Sweet tea	41	\$1.29	300
Chicken leg	7	\$2.59	251

Independent samples t test was used for the calculation and comparison, students who live on campus average monthly consumption of fast food restaurants. There was no significant difference ( $t(149) = 0.78, p > 0.05$ ). The average live on campus for students to spend ( $67.28 \text{ Yuan} \pm 71.29$ ) was no significant difference for students living off campus ( $76.68 \text{ Yuan} \pm 72.74$ ). Independent samples t-test were calculated from live on campus and off-campus student snack compare the average monthly consumption of calories. There was no significant difference ( $t(149) = 1.38, p > 0.05$ ). Students living on campus from fast food consumption ( $10762.51 \pm 11917.07$ ), the average heat is not significantly different from students live in off-campus ( $3751.12 \pm 14365.64$ ).

In particular fast food chain fast-food chain took specific projects and funding are listed in Table 2. The average monthly cost of fast food restaurants to provide students with a healthy BMI ( $60.81 \text{ Yuan} \pm 53.22$ ), overweight ( $77.80 \text{ Yuan} \pm 74.95$ ) and obesity ( $98.37 \text{ Yuan} \pm 108.93$ ), using one-way ANOVA to compare, no

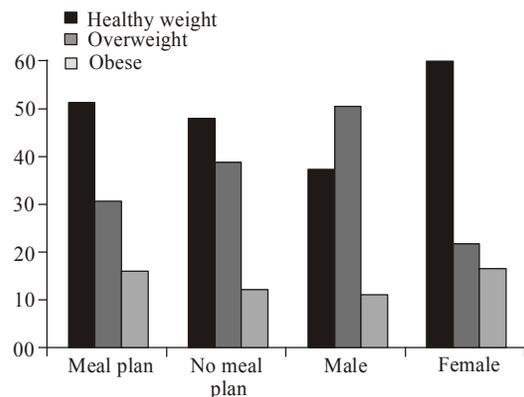


Fig. 1: Percent BMI category within group for gender and meal plan

Significant difference ( $F(2,145) = 2.61, p > 0.05$ ). Figure 1 summarizes the BMI per category group sex and diet plan. The average monthly consumption of snack calories to provide students with a healthy body

mass index (9971.97±9141.58), overweight (14154.20 ±15971.52) and obesity (14815.84±15992.49), using one-way ANOVA for comparison. No significant difference ( $F(2,145) = 2.12, p > 0.05$ ).

**Discussion:** Overweight students consumed fast food more than a month of nearly 15 and 18 Pounds/year than healthy students. This study did not examine weight gain or changes over time; thus, weight gain over the previous year cannot be determined. Studies have shown that, with a high intake of the individual snack more likely to have a higher body mass index (Price and Taste Trump Nutrition When Americans Eat Out, 2009; Bowen and Vinyard, 2004).

Restrictions contained in this study included a limited number of fast food frequency questionnaire snack bar and catering projects. It is possible that participants from other restaurants and did not capture the other food and beverage consumption of fast food in this investigation. This data is dependent on the intake of fast food consumption monthly self-reported.

### CONCLUSION

Overall, students at the University is to spend money and consume calorie snack. From a typical month in the consumption of fast food, men spend more money and consume more than women, more spending and more heat from the fast-food consumption at higher BMI categories of individuals. On college campuses more nutrition education may be beneficial, long-term health effects of education of college students that may arise from the consumption of fast foods and high calorie intake. Future studies are needed to determine how college students of calories consumed and money spent on fast food. Future studies are needed to determine whether to limit fast-food chains around the campus restaurant will help reduce the number of fast food consumption in college students.

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